CLAIMS:

1. A method comprising:

synchronizing a magnetic drive to a patterned magnetic medium based on detection of a set of first surface variations in the patterned magnetic medium; and

selectively applying magnetic fields to a second set of surface variations of the patterned magnetic medium to encode data on the patterned magnetic medium, wherein a timing of the selective application of the magnetic fields is defined by the synchronization of the magnetic drive to the patterned magnetic medium.

2. The method of claim 1, wherein the first and second sets of surface variations comprise first and second protrusions respectively, and selectively applying magnetic fields to the second set of surface variations comprises applying magnetic fields to the second protrusions and not applying magnetic fields to areas between the second protrusions.

3. The method of claim 1, further comprising conditioning the magnetic medium to magnetically expose the first and second sets of surface variations relative to areas between the surface variations in the first set and areas between the surface variations in the second set.

4. The method of claim 1, wherein the patterned magnetic medium exhibits perpendicular magnetic anisotropy, and at least some of the surface variations in the first and second sets define widths of less than approximately 5.0 microns.

5. The method of claim 4, wherein at least some of the surface variations in the first and second sets define widths of less than approximately 1.0 micron.

6. The method of claim 1, further comprising magnetically detecting the set of first surface variations relative to areas between the surface variations in the first set.

7. The method of claim 1, wherein synchronizing the magnetic drive includes identifying a variable frequency oscillator (VFO) signal in the set of first surface variations.

8. A patterned magnetic recording medium comprising:

a substrate; and

a magnetic recording layer formed over the substrate, the magnetic recording layer including a first set of surface variations and a second set of surface variations, wherein the first set of surface variations define a synchronization pattern used by a drive to define timing of selective application of magnetic fields to the second set of surface variations and the second set of surface variations define a pattern arranged for storage of magnetically encoded data.

9. The patterned magnetic recording medium of claim 8, wherein the second set of surface variations define protrusions of a substantially constant width.

10. The patterned magnetic recording medium of claim 9, wherein the protrusions of the second set of surface variations are separated by distances that are substantially constant.

11. The patterned magnetic recording medium of claim 8, wherein the magnetic recording layer exhibits perpendicular magnetic anisotropy, and at least some of the surface variations in the first and second sets define widths of less than approximately 5.0 microns.

12. The patterned magnetic recording medium of claim 8, further comprising a layer formed between the substrate and the magnetic recording layer.

13. The patterned magnetic recording medium of claim 12, wherein the layer formed between the substrate and the magnetic recording layer defines the first and second sets

of surface variations, and wherein the magnetic recording layer substantially conforms to the layer formed between the substrate and the magnetic recording layer.

14. The patterned magnetic recording medium of claim 8, wherein the substrate defines the first and second sets of surface variations, and wherein the magnetic recording layer substantially conforms to the substrate.

15. The patterned magnetic recording medium of claim 8, wherein the first set of surface variations defines a variable frequency oscillator (VFO) signal.

16. A system comprising:

a patterned magnetic recording medium including a substrate, and a magnetic recording layer formed over the substrate, the magnetic recording layer including a first set of surface variations and a second set of surface variations; and

a magnetic drive that synchronizes to the patterned magnetic medium based on detection of the set of first surface variations, and selectively applies magnetic fields to the second set of surface variations to encode data on the patterned magnetic medium, wherein a timing of the selective application of the magnetic fields is defined by the synchronization of the magnetic drive to the patterned magnetic medium.

17. The system of claim 16, wherein the magnetic drive includes a magnetic head positioned relative to the patterned magnetic recording medium and a controller to control application of magnetic fields by the magnetic head.

18. The system of claim 17, wherein the magnetic head defines a gap less than approximately 50% of a width associated with the surface variations in the second set.

19. The system of claim 16, wherein the first and second sets of surface variations comprise first and second protrusions respectively, and the magnetic drive selectively applies magnetic fields to the second set of surface variations by applying magnetic fields

to the second protrusions and not applying magnetic fields to areas between the second protrusions.

20. The system of claim 16, wherein the patterned magnetic recording medium exhibits perpendicular magnetic anisotropy and at least some of the surface variations in the first and second sets define widths of less than approximately 5.0 microns.